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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,794	12/11/2006	Ralf Zuber	Umicore 0155-US	3335
80336	7590	02/15/2011	EXAMINER	
Levin Santalone LLP			WILLS, MONIQUE M	
2 East Avenue				
Suite 201			ART UNIT	PAPER NUMBER
Larchmont, NY 10538			1728	
			MAIL DATE	DELIVERY MODE
			02/15/2011	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/564,794	ZUBER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Monique M. Wills	1728	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 26 November 2010.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 23-25,27-29,31,32,34-37,41-43 and 45-47 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 23-25,27-29,31,32,34-37,41-43 and 45-47 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 11 December 2006 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date _____.	6) <input type="checkbox"/> Other: _____ .

## DETAILED ACTION

### ***Response to Amendment***

This Office Action is responsive to the Amendment filed November 26, 2010. The rejection of claim 27 under 35 U.S.C. 112, second paragraph, is overcome. The rejection of claims 23-24, 26-27, 29-30 & 33-34, 38-44 under 35 U.S.C. 102(e) as being anticipated by Nanaumi et al. U.S. Pub. 2003/0049518, is overcome. The rejection of claims 25, 28 & 31 under 35 U.S.C. 103(a) as being unpatentable over Nanaumi et al. U.S. Pub. 2003/0049518 is overcome. The rejection of claims 32 & 35-37 under 35 U.S.C. 103(a) as being unpatentable over Nanaumi et al. U.S. Pub. 2003/0049518 in view of Biegert U.S. Pub. 2003/0049367 is overcome. Newly added claims 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanaumi et al. U.S. Pub. 2003/0049518 in view of Brunk et al. U.S. Pat. 7,267,902.

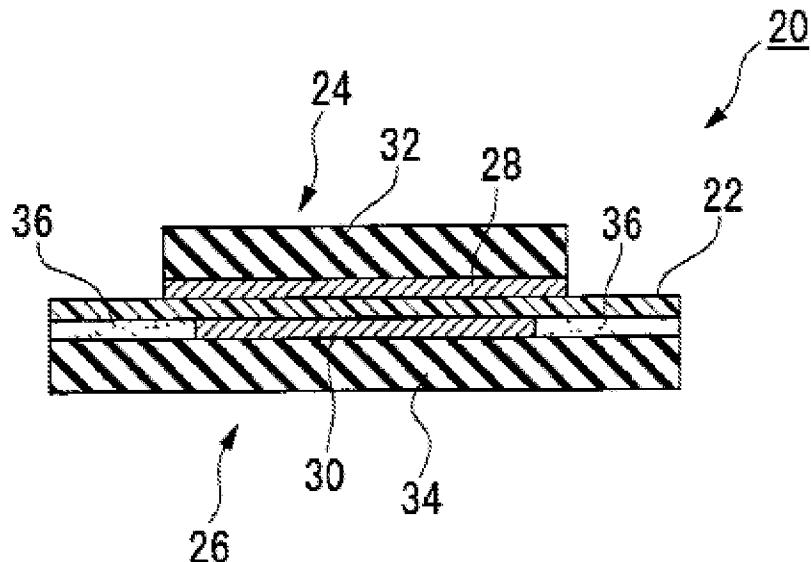
### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 23-24, 25-28, 29-31 & 33-34, 38-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanaumi et al. U.S. Pub. 2003/0049518 in view of Brunk et al. U.S. Pat. 7,267,902.

With respect to **claim 23**, Nanaumi teaches a membrane electrode unit for electrochemical equipment, containing an ionically conductive membrane with a front and back side, a first catalyst layer and a first gas distributor substrate on the front side and a second catalyst layer and a second gas distributor substrate on the back side, in which the first gas distributor substrate has lesser surface dimensions than the ionically conductive membrane and the second gas distributor substrate has essentially the same surface dimensions as the ionically conductive membrane. See paragraph 6.



With respect to **claim 24**, the catalyst layer on the front side and the catalyst layer on the back side of the ionically conductive membrane have different size

dimensions. See paragraph 16. With respect to **claim 26**, the ion-conducting membrane (22) is not supported by the gas diffusion layer on the front side (32). See Figure 1. With respect to **claim 27**, the catalyst layers on the front side and on the back side contain catalyst containing noble metals such as platinum and optionally ionically conductive materials. See paragraph 48. With respect to **claim 29**, the gas distributor substrate comprises porous electrically conductive carbon cloth. See paragraph 48. With respect to **claim 30**, the edge of the first gas distributor substrate and the portion of the front side of the ionically conductive membrane not supported by the first gas distributor substrate are surrounded by a sealing material. See paragraphs 24, 60 and Figure 7. With respect to **claims 33 & 34**, the sealing material is integrally combined with another peripheral plastic frame. See paragraph 24 and Figure 7. With respect to **claims 38-44**, the claim limitations are process claims further defining the product. [E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Here, the membrane electrode assembly taught by Nanaumi has the same structure as the present invention.

Nanaumi does not expressly disclose that the surface of the ion-conducting membrane not supported by the gas diffusion layer and the edges of the gas diffusion layer are enclosed by a sealing material which comprises a thermoplastic polymer and

reinforced by an electrically insulating inorganic material (**claim 23**); wherein the electrically insulating inorganic material is chemically inert (**claim 45**); such as glass fibers (**claim 46**) present in a weight percent of 10 to 30 wt% (**claim 47**). The reference does not disclose that the catalyst has the same size on both sides of the membrane (**claim 25**); that the membrane has a thickness of 10 to 200 microns (**claim 28**) or that the sealing material impregnates an edge region to a depth of at least 0.5 mm (**claim 31**).

Brunk teaches that it is well known in the art to employ thermosetting polymer frames (col. 13, lines 15-40) around gas diffusion layers, wherein the polymer is supported by insulating inorganic layer (14) such as glass fiber frames ( See Figure 1A and , col. 3, lines 10-15, col. 10, lines 50-60). With respect to **claims 45 & 46**, the electrically insulating organic material is inherently chemically inert because it is made of the same material set forth by applicant, glass fibers (col. 10, lines 50-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the polymer and glass fiber frames of Brunk in the membrane electrode assembly of Nanaumi, in order to provide fluid impermeable seals that prevent electrical contact between gas diffusion layers. The skilled artisan recognizes the importance of the structural integrity of the seals in order to obviate leakage.

With respect to **claim 25**, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ catalyst of the same size on both

sides of the membrane of Nanaumi, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CC)A 1955). The skilled artisan recognizes that catalyst size directly effects electrochemical activities.

With respect to the thickness of the membrane (**claim 28**), it would have been obvious to one of ordinary skill in the art at the time the instant invention was employ a thickness of 10 to 200 microns in the membrane of Nanaumi, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CC)A 1955). The skilled artisan recognizes that that thickness of the membrane directly effects ion transport.

With respect to the sealing material impregnating the edge region of the substrate to a depth of 0.5mm (**claim 31**), it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the instant sealing depth in the membrane electrode assembly of Nanaumi, in order to increase structural integrity of the seal.

With respect to **claim 47**, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the glass fibers in a with percent of 10 to 30 Brunk, to support the gas diffusion layer of Nanaumi, in order to properly insulate the gas diffusion layers. The skilled artisan recognizes that varying amounts of class fibers will directly effect insulation between electrodes.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 32 & 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanaumi et al. U.S. Pub. 2003/0049518 in view of Nanaumi et al. U.S. Pub. 2003/0049518 in view of Brunk et al. U.S. Pat. 7,267,902 and further in view of Biegert U.S. Pub. 2003/0049367.

Nanaumi in view of Brunk teach a membrane electrode assembly as described in the rejection recited hereinabove, including fluorine and silicon sealing agents. See paragraph 51.

However, Nanaumi does not disclose: thermoplastic seals such as polyamides (**claim 32**) ; a creep-resistant polymer joined by an adhesive (**claim 35**); having a glass transition temperature (Tg) above 100C (**claim 36**) or an polyethylene adhesive (**claim 37**).

Biegert teaches that it is well known in the art to seal polymer electrolyte membranes with polyamides, because they remain stable at temperatures up to 120 degrees. See paragraph 50. The sealing may contain an additional seal or adhesive such as polyethylene. See paragraph 50.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the polyamide of Biegert, to seal the fuel cell of Nanaumi in view of Brunk, because polyamides will remain stable at high temperatures, thus providing adequate seals in harsh electrochemical environments. The limitations with respect to a creep resistant polymer (claim 35) having a glass transition temperature (Tg) above 100C (claim 36) is satisfied, as Biegert teaches the same polyamide set forth by Application. On page 12, lines 25-35 of the instant specification, polyimide is a creep resistant polymer having the instant glass transition temperature requirement.

With respect to the polyethylene adhesive, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the polyethylene adhesive of Biegert, to join the seal of Nanaumi, in order to improve structural integrity of the fuel cell seals. The skilled artisan recognizes that seals provide gas barriers and obviate leakage of harsh electrochemicals in to the environment.

### ***Response to Arguments***

Applicant asserts that Nanaumi does not expressly disclose the newly added limitation requiring that the surface of the ion-conducting membrane not supported by the gas diffusion layer and the edges of the gas diffusion layer are enclosed by a sealing material which comprises a thermoplastic polymer and reinforced by an

electrically insulating inorganic material. This assertion is correct and the all previously pending rejections are overcome. However, Brunk et al. U.S. Pat. 7,267,902 teaches thermoplastic polymer frames reinforced with glass clothes, satisfying the limitations of the instant claims. The previously pending rejections are newly applied in view of Brunk et al. U.S. Pat. 7,267,902 , as necessitated by amendment.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Jennifer Michener, may be reached at 571-272-1424. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Monique M Wills/

Examiner, Art Unit 1728

/Jennifer K. Michener/  
Supervisory Patent Examiner, Art Unit 1728